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EXAMINER	
LEE, SIU M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/674,730	Applicant(s) WALTHO ET AL.	
	Examiner SIU M. LEE	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _20 August 2009_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-30_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-30_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _14 May 2007_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _8/20/2009_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-30 have been considered but are moot in view of the new ground(s) of rejection because of the amendment.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talvitie (US 6,791,491 B2) in view of Tiller (US 2004/0106381 A1).

(1) Regarding claim 1:

Talvitie discloses a method comprising:

transmitting a test signal (signal transmitted in test environment, column 5, line 13, the examiner interpret the signal send in a test environment is a test signal) over a channel affected by interference from an interference signal associated with a transceiver (the receive signal from the receiving antenna 5 is interference with the transmitted signal from the transmitting antenna 4, column 3, lines 30-35) upon initialization of the transceiver (the examiner interpret the initialization as a calibration process when the transceiver is made) (the correct attenuation value for the adjustment

block 8 and delay for the delay block 9 can be determined experimentally when the electronic device 1 is manufactured, column 5, lines 10-12), the test signal transmitted when the transceiver is not transmitting or receiving operational signals and the test signal sampled from the interference signal (advantageous a test environment is used in which access of external radio frequency signals to the second antenna 5 can be eliminated, column 5, lines 13-15; since it is perform in a test environment, it is obvious that the transceiver is not transmitting or receiving operational signal; the test signal is obtain by a directional coupler 7 from the transmitting path 6 as shown in figure 3, column 4, lines 17-18);

directing the test signal through an adjustable time delay line (delay block 9) to apply a time delay to place the signal in an anti-phase with the interference signal (the phase shift of the delay block 9 is adjusted in a manner that the signal coming via the delay block 9 is substantially in a phase that is reverse relative to the transmission signal of the mobile station affecting in the second directional coupler 10 and the delay block 9 can be implemented by using delay line, figure 2, column 4, lines 15-34, 55-61); and

calibrating the time delay using the test signal, wherein calibrating the time delay includes the time delay line and providing substantially broadband cancellation of the interference signal (advantageously a test environment is used in which access of external radio frequency signals to the second antenna 5 can be eliminated by setting mobile station 2 of the positioning receiver (or from the output of the second directional coupler 10) the strength of the mobile station’s signal and timing and to use these

measured values for setting the parameters of the adjustment block 8 and the delay block 9, column 5, lines 13-20).

Talvitie fails to disclose periodically transmitting the test signal over the channel after the initialization.

However, in the same field of endeavor, Tiller discloses using a calibration (known) signal (the examiner interprets the known calibration signal as a test signal) for calibrating a transmit signal cancellation in wireless receiver, and for continued optimal performance, the calibration procedure can be repeated periodically, such as once every minute, or once every ten minutes (paragraph 0019-0020, 0053).

It is desirable to periodically transmitting the test signal over the channel after the initialization because it can accommodate for variations in either the device and/or the environment (paragraph 0053). therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Tiller in the method of Talvitie to improve the method by adaptive calibration.

(2) Regarding claim 2:

Talvitie discloses wherein providing substantially broadband cancellation includes substantially matching an amplitude of the sampled signal with an amplitude of the interference signal (the attenuation of the adjustment means 8 is adjusted in a manner that the transmission signal of the mobile station in the output of the adjustment means is of the same order as the transmission signal of the mobile station influencing in the second directional coupler 10 and received via the second antenna, column 4, liens 55-61).

(3) Regarding claim 3:

Talvitie discloses wherein providing substantially broadband cancellation includes substantially matching an amplitude of the sampled signal with an amplitude of the interference signal to within about 0.1db accuracy (the same order as the transmission signal of the mobile station influencing in the second directional coupler 10 and received via the second antenna, column 4, liens 55-61).

(4) Regarding claim 4:

Talvitie disclose wherein the method further includes providing about a 180 phase shift to the signal sampled from the interference signal (the delaying means 9 in figure 2 provides a phase that is reverse relative to the transmission signal of the mobile station, column 4, lines 62-66).

(5) Regarding claim 5:

Talvitie discloses wherein providing about a phase that is in reverse (180.degree) phase shift to the signal sampled from the interference signal (the phase shift of the delay block 9 is adjusted in a manner that the signal coming via the delay block 9 is substantially in a phase that is reverse relative to the transmission signal of the mobile station, column 4, lines 62-66).

Talvitie does not explicitly disclose the phase shift includes providing about a 90.degree phase shift upon sampling and providing about a 90 degree phase shift coupling the sampled signal to a signal path receiving the interference signal.

However, it is functional equivalence between a 180 degree phase shift and two 90 degree phase shift so as to obtain an inverse of the interference signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Talvitie reference to include the claimed “a 90 degree phase shift upon sampling and providing about a 90 degree phase shift coupling the sampled signal to a signal path receiving the interference signal” feature in Talvitie’s teaching, in order to obtain an inverted interference signal for canceling out the signal path receiving the interference signal.

(6) Regarding claim 6:

Talvitie discloses a method wherein the method further includes generating the interference signal as a signal from a transmitter through its associated antenna with the substantially broadband cancellation of the interference signal applied to the interference signal received by a second antenna associated with a receiver (the attenuation of the adjustment means 8 is adjusted in a manner that the transmission signal of the mobile station in the output of the adjustment means is of the same order as the transmission signal of the mobile station influencing in the second directional coupler 10 and received via the second antenna, which transmission signal is, accordingly, interference signal in view of the positioning receiver; in a corresponding manner, the phase shift of the delay block 9 is adjusted in a manner that the signal coming via the delay block 9 is substantially in a phase that is reverse relative to the transmission signal of the mobile station affecting in the second directional coupler 10, figure 2, column 4, lines 55-61).

(7) Regarding claim 7:

Talvitie discloses a method wherein the method further includes monitoring a signal strength received from a signal path receiving the sampled signal and the interference signal and adjusting the time delay to minimize the signal strength received from the signal path (column 5, lines 45-65) (since the time delay adjustment is for the time synchronization of the interference signal from transmitting antenna 4 and a correction signal through the BPF 18, adjusting means 8 and delay 9 in order to generate a reverse phase, it is independent of the adjustment of the amplitude of the sample in adjusting means 8).

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Talvitie (US 6,791,491 B2) in view of Tiller (US 2004/0106381 A1) as applied to claim 1 above, and further in view of Sugar (US 2002/0080728 A1).

Talvitie and Tiller disclose a method wherein providing substantially broadband cancellation includes providing substantially broadband cancellation to an interference signal, where the interference signal propagates from a transmitting antenna of a device to a receiving antenna of the device (abstract) and the transmitting antenna are for a GSM mobile phone function wherein the receiving antenna are for GPS function (column 3, lines 64-67).

Talvitie and Tiller fail to disclose the transmitting antenna using a first wireless protocol and the receiving antenna using a second wireless protocol.

However, Sugar et al. discloses a transmitting antenna using a first wireless protocol and a receiving antenna using a second wireless protocol (figure 2 is a block

diagram of the wideband transceiver system architecture that has a transmitting antenna and a receiving antenna and the wideband architecture is used to process multiple WLAN protocols such as Bluetooth, Home RF and IEEE 802.11 in the 2.4 GHz ISM band, paragraph 0018, lines 1-7).

It is desirable to have a transmitting antenna using a first wireless protocol and a receiving antenna using a second wireless protocol because it benefit from IC cost reduction associated with reductions in digital CMOS IC geometry (paragraph 0007). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teaching of Sugar et al. with the method of Talvitie and Tiller to make the method more cost efficient.

5. Claims 9-10, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talvitie (US 6,791,491 B2) in view of Tiller (US 2004/0106381 A1) and Monzello et al. (US 5,428,831).

(1) Regarding claim 9:

Talvitie discloses a method comprising:

transmitting a correction signal (signal sample form the transmission path of the mobile station 2 is taken by the first directional coupler 6 in figure 2) over a second channel (the second channel is the path between the antenna 4 and 5 that when through filter 18, adjusting means 8, and delay block 9 as shown in figure 2), the correction signal sampled form an interference signal (the transmitter of the mobile station generates strong signal at the frequency range of the mobile communication

system and this interference signal is broadband to such a degree that it raises the noise level of the frequency range used in the positioning, column1, line 66 – column 2, line 4);

directing the correction signal (signal sample form the transmission path of the mobile station 2 is taken by the first directional coupler 6 in figure 2) to propagate from a first signal path (transmitting path of the mobile station 2) through an adjustable time delay line (adjustable time delay block 9, the delay block 9 can be implemented by using a delay line, column 5, lines 26-27) to a second signal path (receiving path of the positioning receiver 3 in figure 2) to provide a time delay placing the correction signal in an anti-phase with the interference signal (the phase shift of the delay block 9 is adjusted in a manner that the signal coming via the delay block 9 is substantially in a phase that is reverse relative tot he transmission signal of the mobile station affecting in the second directional coupler 10, column 4, lines 62-66), the interference signal propagate over an interference path between the first signal path and the second signal path (the interference signal is transmitted by the antenna (4 in figure 2) of the mobile station 2 and received by the antenna 5 of the positioning receiver 3), the interference path separate from a primary path of the correction signal (the interference path is between the transmitting and receiving antenna 4 and 5 and the primary path of the correction signal is through the adjustment means 8 and delay means 9);

adjusting an amplitude of the correction signal (the purpose of the adjusting means 8 is to adjust the strength of the transmission signal taken via the directional coupler, column 4, lines 27-29).

Talvitie fails to disclose periodically transmitting and receiving a test signal over a first channel affected by interference from an interference signal associated with a transceiver, the test signal transmitted when the transceiver is not transmitting or receiving operational signals, adjusting the amplitude of the correction signal to provide substantially broadband cancellation of the interference signal up upon initialization of the transceiver; and (b) adjusting the time delay, wherein the time delay and the amplitude are adjusted independent of each other.

With respect to (a), Tiller discloses periodically (adjustment , however, can be made periodically wherever necessary to accommodate for any changes such as environmental changes, paragraph 0029, lines 10-13) transmitting and receiving a test signal (known signal or calibration signal transmitted by the transmitting antenna 240 and received by the receiver antenna 250 (first channel), paragraph 0020) over a channel affected (transmitting a known signal or a calibration signal by the transmitter) by interference from an interference signal associated with a transceiver (transceiver 200 in figure 2), the test signal transmitted when the transceiver is not transmitting or receiving operational signals (as the transmitter is transmitting the known signal or calibration signal, it is obvious that the transceiver is not transmitting or receiving operational signal) and the test signal sampled from the interference signal (paragraph 0034, sampler 255 in figure 2), adjusting the amplitude of the correction signal based on the received test signal (periodically the gain and phase setting can be updated and re-stored, paragraph 0030) to provide substantially broadband cancellation of the interference signal (the transmitted calibration signal can be a broadband signal,

paragraph 0020) upon initialization of the transceiver (for continued optimal performance, the calibration procedure can be repeated periodically to update the coefficient, thereby accommodating for variation in either the device and/or the environment, paragraph 0053; the examiner interprets the initialization of the transceiver will means variation of the transceiver and therefore it is obvious the calibration process will perform to accommodate fro variation in the device), wherein the time delay and the amplitude are adjusted independently of each other (the time delay 280in figure 2, the compensation delay is selected to equate to the antenna-to-antenna propagation delay and compensate fro other delays due to the RF receive oath, such as length of transmission line or other phase-dependent devices, and the gain phase adjustment is adjusted by the coefficients CP1, CP2, and CA as shown in figure 3, paragraph 0047-0049, therefore, the delay adjustment and the amplitude adjustment are independently of each other).

It is desirable to periodically transmitting and receiving a test signal over a channel affected by interference from an interference signal associated with a transceiver, the test signal transmitted when the transceiver is not transmitting or receiving operational signals and resetting the time delay based on the received test signal and resetting the time delay based on the received test signal and adjusting the amplitude of the correction signal to provide substantially broadband cancellation of the interference signal upon initialization of the transceiver because it can accommodate for changes such as environmental changes and optimize the performance of the method (paragraph 0029, lines 12-13). Therefore, it would have been obvious to one of

ordinary skill in the art at the time of invention to employ the teaching of Tiller in the method of Talvitie to improve the adaptability of the method.

With respect to (b), Monzello et al. discloses a controller (control computer 166 in figure 2) that adjusting a time delay (adj delay 188 in figure 2) according to a reference signal (the examiner interprets the reference signal as a test signal) by correlation process (column 11, lines 13-28) to remove the time mismatch between the interference signal path and the cancellation signal path, and this calibration process can be programmed to occur at regular intervals to compensate for any changes in the environment or to compensate for system dynamics or when the system configuration is changed (column 11, lines 45-49) (since the time delay and the amplitude is adjusted by two different process, therefore, the time delay adjustment and the amplitude adjustment are independent).

It is desirable to adjust the time delay by using a test signal periodically because it can compensate for the any changes in the environment or to compensate for system dynamics or when the system configuration is changed (column 11, lines 45-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the time delay adjustment process of Monzello et al. in the method of Talvitie and Tiller to compensate for the time mismatch cause by the environmental and system changes.

(2) Regarding claim 10:

Talvitie discloses wherein the method further includes sampling the interference signal to generate the correction signal (signal sample form the transmission path of the

mobile station 2 is taken by the first directional coupler 6 in figure 2, column 5, lines 54-55).

(3) Regarding claim 12:

Talvitie discloses a method includes:

transmitting a test signal along the first signal path (when the equipment is being manufacture, under a test environment, a test signal is being transmitted by the mobile station, column 5, lines 15);

receiving a response signal associated with the test signal from the second signal path, the response signal having a signal strength (to measure from the input of the positioning receiver the strength of the mobile station's signal and timing, column 5, lines 15-18); and

adjusting the time delay and adjusting the amplitude to minimize the signal strength (use these measured values for setting the parameters of the adjustment block 8 and the delay block 9, column 5, liens 19-20).

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Talvitie (US 6,791,491 B2) in view of Tiller (US 2004/0106381 A1) and Monzello et al. (US 5,428,831) as applied to claim 9 above, and further in view of Rose, Jr. (US 5,127,101).

Talvitie, Tiller, and Monzello et al. disclose all the subject matter as discussed in claim 9 above except wherein the adjusting the time delay and adjusting the amplitude occurs during a time interval in which no communication signals are being externally transmitted or received along the first signal path or the second signal path.

However, Rose, Jr. further discloses wherein the adjusting the time delay and adjusting the amplitude occurs during a time interval in which no communication signals are being externally transmitted or received along the first signal path or the second signal path (although auto alignment sequence for each site is implemented on a periodic basis, the alignment mode is activated only when no system activity is sensed, column 5, lines 12-14).

It is desirable to adjusting the time delay and adjusting the amplitude occurs during a time interval in which no communication signals are being externally transmitted or received along the first signal path or the second signal path because it prevents lost of data. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Rose, Jr. in the method of Talvitie, Tiller and Monzello et al. to improve the integrity of the method.

7. Claims 13, 17-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGeehan et al. (US 6,229,992 B1) in view of Talvitie (US 6,791,491 B2) and Monzello et al. (US 5,428,831).

(1) Regarding claim 13:

McGeehan et al. discloses an apparatus comprising:

a first signal path including a transmitted signal from a transceiver (signal path for the transmitting antenna 2 in figure 2, column 2, lines 5-19);

a second signal path including a received signal by a transceiver and affected by interference from an interference signal associated with the transceiver (signal path for

the receiving antenna 1 in figure 2, column 2, lines 5-19, the signal from antenna 1 will contain a significant degree of unwanted coupling of the transmitter output signal from transmitting antenna 2, this coupling must be removed in order to prevent overloading of the front end components within the receiver section, column 2, lines 8-12);

a adjustable delay element inserted in the signal paths to permit cancellation of elements of the unwanted transmitted output signal which have arrived at the receive antenna by a longer path than the direct transmission (column 3, lines 52-56); and

a variable attenuator (variable attenuator 12 in figure 2) coupled to the phase shift element to amplitude match the correction signal to the interference signal to provide substantial broadband cancellation of the interference signal (a control circuit 16 is configured to provide the required parameter optimization for both of the signal processing elements 11 (phase shift element) and 12 (variable attenuator) based on the measurement of error signal relative to reference signal derived from the transmitter, the variable attenuator 12 element will be controlled to achieve and maintain optimum cancellation of the unwanted transmitter output signal from the receive signal path, column 2, lines 51-59)

a controller to determine the amplitude of the correction signal (controller 16 adjust he variable attenuator 12 as shown in figure 2) using the test signal (sounding signal or reference signal) (the circuit shown in figure 8 works by injecting a sounding signal into the transmitter output signal, and by detecting that sounding signal in the received signal path, and then applying the cancellation signal, such that the sounding

signal component in the received signal is minimized, column 5, lines 30-35, column 6, lines 11-20)

McGeehan et al. fails to disclose (a) an adjustable delay line to provide a time delay to a correction signal propagating from the first signal path to the second signal path to place the correction signal in an anti-phase with an interference signal on an interference path from the first signal path to the second signal path, the correction signal sampled from the transmitted signal and the transceiver configured to transmit a test signal sampled from the interference signal upon initialization of the transceiver from the first signal path to the second signal path when the transceiver is not transmitting or receiving operational signals; and wherein the time delay and the amplitude are adjusted independently of each other, and (b) a controller to determine the time delay using the test signal to adjust the delay.

With respect to (a), Talvitie discloses using adjustable delay line (the adjustable delay block 9 can be implemented for example by using a delay lines, column 5, lines 26-27) that can provide a time delay to a correction signal propagating from the first signal path to the second signal path to place the correction signal in an anti-phase with an interference signal on an interference path from the first signal path to the second signal path (the phase shift of the delay block 9 is adjusted in a manner that the signal coming via the delay block 9 is substantially in a phase that is reverse relative to the transmission signal of the mobile station affecting in the second directional coupler 10, column 4, lines 62-66), the correction signal sampled from the transmitted signal (coupler 7 in figure 2 sampled the correction signal from the transmitted signal, column

4, lines 17-20); and transmitting a test signal (signal transmitted in test environment, column 5, line 13) over a channel affected by interference from an interference signal associated with a transceiver (the receive signal from the receiving antenna 5 is interference with the transmitter signal fro the transmitting antenna 4, column 3, lines 30-35) upon initialization of the transceiver (the examiner interpret the initialization as a calibration process when the transceiver is made) (the correct attenuation value for the adjustment block 8 and delay for the delay block 9 can be determined experimentally when the electronic device 1 is manufactured, column 5, lines 10-12), the test signal transmitted when the transceiver is not transmitting or receiving operational signals and the test signal sampled from the interference signal (advantageous a test environment is used in which access of external radio frequency signals to the second antenna 5 can be eliminated, column 5, lines 13-15; since it is perform in a test environment, it is obvious that the transceiver is not transmitting or receiving operational signal; the test signal is obtain by a directional coupler 7 from the transmitting path 6 as shown in figure 3, column 4, lines 17-18).

It is desirable to have an adjustable delay line to provide a time delay to a correction signal propagating from the first signal path to the second signal path to place the correction signal in an anti-phase with an interference signal on an interference path from the first signal path to the second signal path, the correction signal sampled from the transmitted signal; and the transceiver configured to transmit a test signal sampled from the interference signal upon initialization of the transceiver from the first signal path to the second signal path when the transceiver is not transmitting or receiving

operational signals because it allow for infinite phase adjustability and calibration and allowing presetting the parameters used by adjustment block 8 and delay block 9 for interference cancellation (column 5, lines 18-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Talvitie in the apparatus of McGeehan et al. to increase the flexibility of the system and increase the processing speed of cancelling interference.

With respect to (b), Monzello et al. discloses a controller (control computer 166 in figure 2) that adjusting a time delay (adj delay 188 in figure 2) according to a reference signal (the examiner interprets the reference signal as a test signal) by correlation process (column 11, lines 13-28) to remove the time mismatch between the interference signal path and the cancellation signal path, and this calibration process can be programmed to occur at regular intervals to compensate for any changes in the environment or to compensate for system dynamics or when the system configuration is changed (column 11, lines 45-49) (since the time delay and the amplitude is adjusted by two different process, therefore, the time delay adjustment and the amplitude adjustment are independent).

It is desirable to adjust the time delay by using a test signal periodically because it can compensate for the any changes in the environment or to compensate for system dynamics or when the system configuration is changed (column 11, lines 45-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the time delay adjustment apparatus of Monzello et al. with the

apparatus McGeehan et al. and Talvitie to compensate for the time mismatch cause by the environmental and system changes.

(2) Regarding claim 17:

McGeehan et al. apparatus further including a first tap to couple the correction signal to a primary path from the first signal path to the adjustable delay (coupler 3 in figure 1 sample the transmitted output signal and then processing in a processor unit 4, column 2, lines 12-15).

(3) Regarding claim 18:

McGeehan et al. apparatus further including a second tap to couple the primary path to the second signal path (subtractor 5 in figure 1, after the signal is processed by the processor 4 it is passed on to the subtractor 5 and subtract from the receiving path, column 2, lines 15-17).

(4) Regarding claim 19:

McGeehan et al. apparatus further including a phase corrector coupled to the adjustable delay line (phase shift element 11 in figure 2), the phase corrector to provide a small phase adjustment to the anti-phase generated by the adjustable delay line.

(5) Regarding claim 20:

McGeehan et al. discloses a controller to manage the variable attenuator, the adjustable delay line, and the phase corrector (control circuit 16 provides optimum control of the signal processing element to maximize the cancellation of the transmitter output signals in the receive signal path, column 3, lines 13-16).

(6) Regarding claim 21:

McGeehan et al. apparatus further discloses wherein the first signal path includes a transmitter and a first antenna (transmitter 9 and antenna 2 in figure 2), and the second signal path includes a receiver and a second antenna (receiver 15 and antenna 1 in figure 2, column 2, lines 27-50).

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over McGeehan et al. (US 6,229,992 B1) in view of Talvitie (US 6,791,491 B2) and Monzello et al. (US 5,428,831) as applied to claim 13 above, and further in view of Loo et al. (US 5,757,319).

McGeehan et al., Talvitie, and Monzello et al disclose all the subject matter as discuss above except wherein the adjustable delay line includes one or more microelectromechanical switches.

However, Loo et al. discloses an adjustable delay line includes one or more microelectromechanical switches (figure 2, column2, lines 49-53 and column 4, lines 56-64).

It is desirable to have the adjustable delay line includes one or more microelectromechanical switches because the microelectromechanical switches have low loss over a wide frequency range (column 3, lines 60-61). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to replace the variable delay line of McGeehan et al., Talvitie, and Monzello et al. with the adjustable delay line includes one or more microelectromechanical switches as taught by Loo et al. to improve the performance of the apparatus.

9. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGeehan et al. (US 6,229,992 B1) in view of Talvitie (US 6,791,491 B2) and Monzello et al. (US 5,428,831) as applied to claim 13 above, and further in view of Sengupta et al. (US 6,556,102 B1).

(1) Regarding claim 15:

McGeehan et al., Talvitie, and Monzello et al. disclose all the subject matter as discuss above except wherein the adjustable delay line includes a material whose permittivity can be changed to adjust the speed of propagation of the correction signal.

However, Sengupta et al. discloses an adjustable delay line includes a material whose permittivity can be changed to adjust the speed of propagation of the correction signal (figure 5 shows a coplanar tunable dielectric delay line 92, the delay line takes advantage of low loss voltage tunable materials to build tunable delay lines that vary the dielectric constant by a change of the voltage across the material, the delay line is made of multiple layers of tunable material, column 6, lines 40-42 and 58-62).

It is desirable to have the adjustable delay line includes a material whose permittivity can be changed to adjust the speed of propagation of the correction signal because the accurate time delay will be easier to obtain by tuning a DC voltage (column 7, lines 31-32). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to replace the variable delay line of McGeehan et al., Talvitie, and Monzello et al. by the tunable delay line of Sengupta et al. to improve the accuracy of the delay line.

(2) Regarding claim 16:

Sengupta et al. further discloses wherein the material is barium strontium titanate (column 8, lines 26-28).

10. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over McGeehan et al. (US 6,229,992 B1) in view of Talvitie (US 6,791,491 B2) and Monzello et al. (US 5,428,831) as applied to claim 21 above, and further in view of Stolarczke et al. (US 5,093,929).

McGeehan et al., Talvitie, and Monzello et al. disclose all the subject matter as discuss above except wherein the first signal path further includes a transmission line coupled to the transmitter and a first cable having a fixed propagation delay coupled to the first antenna.

However, Stolarczke et al. discloses the first signal path further includes a transmission line coupled to the transmitter and a first cable having a fixed propagation delay coupled to the first antenna (the transmitter 204 in figure 6b is tightly coupled to the transmission line conductor 32 by a pager repeater vertical tuned loop antenna 210 and an antenna cable 212 which link antenna 210 to transmitter, it is inherent that a antenna cable to have a fixed propagation delay, column 8, lines 18-22).

It is desirable to have the first signal path further includes a transmission line coupled to the transmitter and a first cable having a fixed propagation delay coupled to the first antenna because the repeater can communicate with the base station using medium frequency (column 4, lines 23-25). Therefore, it would have been obvious to

one of ordinary skill in the art at the time of invention to combine the teaching of Stolarczke et al. with the apparatus of McGeehan et al., Talvitie, and Monzello et al. to improve the functionality of the apparatus.

11. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over McGeehan et al. (US 6,229,992 B1) in view of Talvitie (US 6,791,491 B2) and Monzello et al. (US 5,428,831) as applied to claim 21 above, and further in view of Young (US 6,643,522 B1).

McGeehan et al., Talvitie, and Monzello et al. disclose all the subject matter as discuss above except wherein the transmitter is a first transceiver that uses a first wireless protocol and the receiver is a second transceiver that uses a second wireless protocol.

However, Young discloses wherein the transmitter is a first transceiver that uses a first wireless protocol and the receiver is a second transceiver that uses a second wireless protocol (column 11, lines 11-20).

It is desirable wherein the transmitter is a first transceiver that uses a first wireless protocol and the receiver is a second transceiver that uses a second wireless protocol because it provides multiple services for users of different systems (column 3, lines 1-2). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teaching of Young with the method of McGeehan et al., Talvitie, and Monzello et al. to improve the functionality of the system.

12. Claims 24, 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Talvitie (US 6,791,491 B2) in view of McGeehan et al. (US 6,229,992 B1) and Monzello et al. (US 5,428,831).

(1) Regarding claim 24:

Talvitie et al. discloses a system comprising:

a processor (CPU 14a and DSP 14b in figure 3);

a memory coupled to the processor (memory 15a and 15b in figure 3);

a transceiver (device in figure 3) having a first signal path (the transmitting path of the mobile station 2 in figure 2) and a second signal path (the receiving path of the positioning receiver 3 in figure 2), the first signal path on which signals responsive to the processor are transmitted (the processor 14a, 14b can cause signals that interfere with the operation of the positioning receiver 3 to be transmitted, column 5, lines 38-40) and the second signal path on which signals to provide a communication to the processor are received and affected by interference from an interference signal associated with the transceiver (signal received by the receiving antenna 5 is interfere by the signal transmitted by the transmitting antenna 4 is past on to the DSP 14b as shown in figure 3, column 3, lines 30-35), the transceiver configured to transmit a test signal (signal transmitted in test environment) sampled from the interference signal upon initialization of the transceiver from the first signal path to the second signal path when the transceiver is not transmitting or receiving operational signal (the examiner interpret the initialization as a calibration process when the transceiver is made, the correct attenuation value for the adjustment block 8 and delay for the delay block 9 can be

determined experimentally when the electronic device 1 is manufactured, column 5, lines 10-12, advantageous a test environment is used in which access of external radio frequency signals to the second antenna 5 can be eliminated, column 5, lines 13-15; since it is perform in a test environment, it is obvious that the transceiver is not transmitting or receiving operational signal; the test signal is obtain by a directional coupler 7 from the transmitting path 6 as shown in figure 3, column 4, lines 17-18);

a first antenna coupled to the first signal path to transmit the signals from the first signal path (antenna 4 transmit signal from the mobile station 2);

an adjustable delay line (delay block 9 in figure 2) to provide a time delay to a correction signal propagating from the first signal path to the second signal path, the adjustable delay line to place the correction signal in an anti-phase with an interference signal (the phase shift of the delay block 9 is adjusted in a manner that the signal coming via the delay block is substantially in a phase that is reverse relative to the transmission signal of the mobile station affecting in the second directional coupler 10, column 4, lines 62-66), the interference signal on an interference path (the transmission path from antenna 4 to antenna 5) between the first signal path and the second signal path, the interference path separate from a primary path of the correction signal (the correction signal passes through the adjusting means 8 and delay block 9 as disclose in figure 2);

a variable attenuator (adjusting means 8 in figure 2) couple to the adjustable delay line (adjusting means 8 is couple to the delay block 9 as shown in figure 2) to amplitude match the correction signal to the interference signal to provide substantial

broadband cancellation of the interference signal (the attenuation of the adjusting means 8 is adjusted in a manner that the transmission signal of the mobile station in the output of the adjustment means is of the same order as the transmission signal of the mobile station influencing in the second directional coupler 10 and received via the interference signal in view of the positioning receiver, column 4, lines 55-61, the delay block 9 is adjusted in a manner that the signal coming via the delay block 9 is substantially in a phase that is reverse relative to the transmission signal, column 4, lines 62-5).

Talvitie fails to explicit discloses (a) a controller coupled to the transceiver and regulate control signals provided to transceiver, the control signal allows for setting amplitude delay and phase correction wherein the time delay and the amplitude attenuation are adjusted independent of each other, and (b) a controller coupled to the transceiver and configured to determine the time delay using the test signal and regulate control signal for setting the time delay.

However, McGeehan et al. discloses a controller (controller 16 in figure 2) coupled to the transceiver and regulates control signal provided to transceiver, the control signals allows for amplitude attenuation and phase correction (a control circuit 16 is configured to provide the required parameter optimization for both of the signal processing elements 11 and 12, based on the measurement of one or more error signals at 17 relative to one or more reference signals at 18 derived from the transmitter, column 2, lines 55-59; and alternatively, delay element can be inserted in

some or all of the signal paths to permit cancellation of element of the unwanted transmission signal).

It is desirable to have a controller coupled to the transceiver and regulate control signals provided to transceiver, the control signal allows for setting amplitude delay and phase correction wherein the time delay and the amplitude attenuation are adjusted independent of each other because it can determine the parameters in a short time. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teaching of McGeehan et al. in the system of Talvitie to improve the processing speed of the system.

With respect to (b), Monzello et al. discloses a controller (control computer 166 in figure 2) that adjusting a time delay (adj delay 188 in figure 2) according to a reference signal (the examiner interprets the reference signal as a test signal) by correlation process (column 11, lines 13-28) to remove the time mismatch between the interference signal path and the cancellation signal path, and this calibration process can be programmed to occur at regular intervals to compensate for any changes in the environment or to compensate for system dynamics or when the system configuration is changed (column 11, lines 45-49) (since the time delay and the amplitude is adjusted by two different process, therefore, the time delay adjustment and the amplitude adjustment are independent).

It is desirable to adjust the time delay by using a test signal periodically because it can compensate for the any changes in the environment or to compensate for system dynamics or when the system configuration is changed (column 11, lines 45-49).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the time delay adjustment controller of Monzello et al. with the apparatus McGeehan et al. and Talvitie to compensate for the time mismatch cause by the environmental and system changes.

(2) Regarding claim 26:

McGeehan et al. further discloses wherein the controller is configured to manage the variable attenuator and the adjustable delay line (the digital signal processor 16 in figure 5, column 3, line 66-column 4, line 3).

(3) Regarding claim 27:

Talvitie discloses wherein providing about a phase that is in reverse (180.degree) phase shift to the signal sampled from the interference signal (the phase shift of the delay block 9 is adjusted in a manner that the signal coming via the delay block 9 is substantially in a phase that is reverse relative to the transmission signal of the mobile station, column 4, lines 62-66).

Talvitie does not explicitly disclose the phase shift includes providing about a 90.degree phase shift upon sampling and providing about a 90 degree phase shift coupling the sampled signal to a signal path receiving the interference signal.

However, it is functional equivalence between a 180 degree phase shift and two 90 degree phase shift so as to obtain an inverse of the interference signal.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Talvitie reference to include the claimed “a 90 degree phase shift upon sampling and providing about a 90 degree phase shift coupling the sampled signal

to a signal path receiving the interference signal" feature in Talvitie's teaching, in order to obtain an inverted interference signal for canceling out the signal path receiving the interference signal.

(4) Regarding claim 28:

Talvitie discloses wherein the system further includes a data transmitting module coupled to the first signal path collocated with a data receiving module coupled to the second signal path (the system in figure 2 comprises a mobile station the transmit signal out from the antenna 4, therefore there is a transmitting module couple to the first signal path collocated with a data receiving module, positioning receiver 3 coupled to the second signal path as disclose in figure 2).

(5) Regarding claim 29 and 30:

Talvitie discloses wherein the system is a computer or a laptop (the system discloses in figure 3 contains a digital signal processing and memory to process the data for a transceiver, therefore, the system in figure 3 can be consider as a computer or a laptop computer).

13. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Talvitie (US 6,791,491 B2) in view of McGeehan et al. (US 6,229,992 B1) and Monzello et al. (US 5,428,831) as applied to claim 24 above, and further in view of Sugar et al. (US 2002/0080728 A1).

Talvitie, McGeehan et al. and Monzello et al. disclose all the subject matter as discuss above except wherein the first signal path includes a transmitter to transmit a

first signal using a first protocol and the second path includes a receiver and a second antenna to receive a second signal using a second protocol.

However, Sugar et al. discloses wherein the first signal path includes a transmitter to transmit a first signal using a first protocol and the second path includes a receiver and a second antenna to receive a second signal using a second protocol (figure 2 is a block diagram of the wideband transceiver system architecture that has a transmitting antenna and a receiving antenna attached to a transmitter and a receiver respectively, and the wideband architecture is used to process multiple WLAN protocols such as Bluetooth, Home RF and IEEE 802.11 in the 2.4 GHz ISM band, paragraph 0018, lines 1-7).

It is desirable to have the first signal path includes a transmitter to transmit a first signal using a first protocol and the second path includes a receiver and a second antenna to receive a second signal using a second protocol because it benefit from IC cost reduction associated with reductions in digital CMOS IC geometry (paragraph 0007). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to combine the teaching of Sugar et al. with the system of Talvitie, McGeehan et al., and Monzello et al. to make the method more cost efficient.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Watkinson (US 7,463,733 B2) discloses an interference cancellation equipment.

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIU M. LEE whose telephone number is (571)270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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